October 10, 2008
Current Water Use Efficiency Policy and Programs and Estimate of Agricultural and Urban Water Use

Report Prepared for the Delta Vision Task Force
by the Department of Water Resources in coordination with the California Department of Food and Agriculture

On September 25, 2008 staff of the Delta Vision Task Force requested a short factual statement of (a) current policies and programs to achieve increased efficiency and conservation in the use of water and (b) whatever evidence is available to show the current statewide per capita use of water in urban areas (for residential, business and industrial uses), including any regional differences if such information is available. In addition, staff requested information about the actual total patterns of water use by agriculture in the state as a whole during this same time period, and, where possible, by geographical sub unit of the state. This draft report provides our response to the request.

1. Current Policies and Programs to Achieve Increased Efficiency

Agriculture

Starting in early 1980's, the state, in cooperation with other stakeholders, developed a number of technical assistance programs to help water suppliers and growers to further advance efficiency of water use. These programs include:

<u>California Irrigation Management Information System (CIMIS)</u>

CIMIS is a network of over 130 automated and computerized weather stations that collect climatological data and information and calculate reference evapotranspiration for a given area. Water users access reference evapotranspiration data for their specific area and using specific crop coefficients. In doing so they can estimate amount and timing for any given irrigation event. Department of Water Resources (DWR) is developing a standard data protocol for the transmission of evapotranspiration data and extending CIMIS statewide which will allow for significant improvement in landscape management and irrigation scheduling and saving significant amounts of water. The completion of standard data protocol is expected in 2009 and extension of CIMIS services statewide will require additional resources to complete. Studies have shown a saving of 37 gallons per day for residential irrigation and 545 gallons per day for non-residential irrigation, as well as runoff reduction of up to 50 percent when weather-based irrigation controllers using evapotranspiration data are installed.

Mobile Irrigation Management Laboratories – The Mobile Labs

Mobile Labs are used by farmers wanting to evaluate on-farm irrigation efficiency and uniformity of irrigation water distribution over a given field to determine how to improve their irrigation system and management. Today, due to lack of funds, only four mobile labs are funded and operated by local agencies.

Irrigation Training

DWR in cooperation with Cal Poly-San Luis Obispo, developed a comprehensive training and education program to provide information to the growers, irrigators, and water suppliers including the latest practical and technological information on on-farm and district wide irrigation management issues. These training opportunities include workshops on canal automation, flexible water delivery systems, short courses on a variety of irrigation system management and maintenance, seminars, field evaluation, district water delivery system evaluation and others.

Agricultural drainage reduction and reuse

DWR, in cooperation with water suppliers and growers, and resource conservation districts in the drainage problem area of the San Joaquin Valley, have developed on-farm efficiency improvement projects to reduce excessive deep percolation to reduce the total volume of selenium contaminated drainage water. Numerous research projects, studies, and demonstration projects have been conducted in the drainage problem area.

State Agricultural Water Use Efficiency Grant Programs

Since 2001, over $29 million has been allocated for grants to irrigation districts and others to improve water use efficiency and achieve related benefits such as improved water quality or improved timing of natural flows. Funding sources include voter-approved propositions 13 and 50.

Proposition 84 approved by California voters in 2006 provides up to $1 billion in additional funding for resource management strategies including water conservation projects. The first proposal solicitation is expected late in calendar 2008.

Through these grant funds water suppliers and other eligible applicants have and continue to implement efficiency measures such as education and training, resources assistance, demonstration projects, mobile laboratories, workshops, canal lining, canal system improvements, irrigation water reuse, water flow monitoring, irrigation management, irrigation technology studies and feasibility studies.

Decades of implementing the efforts mentioned above have helped California to significantly improve irrigation efficiency. The improvements have been both at on-farm and irrigation district levels. By the mid-1990's, for example, on-farm irrigation efficiencies statewide averaged 72 percent, with significant reuse of over-applied water

resulting in region or irrigation district efficiencies of over 95 percent. A decade later, many areas of the state have improved their on-farm efficiency even further. For example, growers in Westlands Water District on the westside of San Joaquin Valley have 85 percent on-farm irrigation efficiency. Growers in the Imperial Irrigation District and Coachella Water District show on-farm irrigation efficiencies of over 76 percent. Meanwhile, crop production with the same amount of water has increased significantly.

A recent report (2008) provides results of a survey of 10,000 growers in California (excluding rice, dry-land, and livestock producers) which indicated that between 1972 and 2002 the areas planted to orchard increased from 15 to 31 percent and the areas planted to vineyards increased from 6 to 16 percent, while areas planted to vegetables remained relatively unchanged. Meanwhile, areas planted to field crops (such as cotton and alfalfa) decreased from 67 to 42 percent. The survey also indicates that the land irrigated by low-volume (drip and micro sprinklers) irrigation has increased by about 33 percent while the amount of land irrigated by surface irrigation methods has decreased by about 31 percent.

In California, many growers and water suppliers implement state-of-the-art design, delivery, and management practices to increase production efficiency and conserve water. As a result, they continue to make great strides toward increasing the economic value and efficiency of their water use. One indicator of agricultural water use efficiency improvement is that agricultural production per unit of applied water (tons/acre-foot) for 32 important California crops increased by 38 percent from 1980 to 2000.

Agricultural Water Management Planning and Implementation of Efficient Water Management Practices:

In 1991, Assembly Bill (AB) 3616 required that the state develop a list of Agricultural Efficient Water Management Practices (EWMPs) in cooperation with irrigation/water districts, and assist water suppliers in developing water management plans.

A water management plan should identify all cost-effective EWMPs that must be implemented and develop a schedule for implementation. Water suppliers may exempt implementation of a particular EWMP, but only based on a comprehensive Net Benefit Analysis. A Net Benefit Analysis is a comprehensive process that includes engineering benefit-to-cost analysis as well as any quantitative and qualitative analysis of environmental, third party, social, economic, and financial impacts of implementing any given EWMP. The work of AB 3616 has evolved into formation of the non-profit Agricultural Water Management Council (AWMC), which oversees development of agricultural water management plans and implementation of EWMPs. The state is a partner and signatory to the Memorandum of Understanding (MOU), which established the AWMC, and continues its participation in the AB 3616 process by providing financial and technical assistance and by providing an analysis of all water management plans submitted to AWMC. Over 79 major water suppliers and irrigation districts, constituting about 4.6 million acres of irrigated land and a total of 5.86 million acres of agricultural land, are signatories to the MOU. The signatories to the AB 3616 process and MOU make a voluntary commitment to develop water management plans and implement all locally cost-effective EWMPs.

Urban

According to California Water Plan Update 2005, in 2000 cities and suburbs used approximately 8.7 million acre-feet (maf) of water. Californians have made progress on urban water use efficiency over the past few decades. As has been demonstrated in various regions of the state, an increase in population must not necessarily result in a proportionate increase in urban water use. For example, the Los Angeles Department of Water and Power reports in its Urban Water Management Plan Update 2002-2003 that "water conservation continues to play an important part in keeping the city's water use equivalent to levels seen 20 years ago." The San Diego County Water Authority reported that their total consumption for 2003 was up less than one percent since 1990 with a population growth of 16 percent. According to the Southern California Association of Governments (SCAG), within the MWD service area in the SCAG region, total water consumption did not experience significant increases for several years in the mid-1990s due to the recession, wet weather, conservation efforts, and lingering drought impacts. In 2001, total water consumption at 3.2 maf was about the same as in 1990, despite an increase of almost 1.5 million residents since 1990. Of total consumption, only 8 percent was for agricultural purposes and the rest was for urban (municipal and industrial) uses. According to the Bay Area Water Supply and Conservation Agency (BAWSCA), which oversees the Hetch Hetchy water supply to cities throughout San Mateo, Santa Clara and Alameda counties, "In 2005-2006, the average water use per person in BAWSCA's customer territory was 88 gallons per person per day, which is 15 percent lower than in 1986-1987, and 23 percent lower than in 1976-1977. About 60 percent of the water is used by residents and 40 percent by businesses."

Governor's 20 percent Reduction Target by 2020

On February 28, 2008, Governor Schwarzenegger sent a letter to Senators Perata, Machado, and Steinberg outlining key elements under development for a comprehensive solution to the challenges facing the Sacramento-San Joaquin Delta. The first element identified was an aggressive new goal for water conservation in California. The Governor called for "A plan to achieve a 20 percent reduction in per capita water use statewide by 2020" and directed state agencies to prepare the plan. A team of state agencies (also known as 20X2020 Team) will develop a plan by early 2009.

The California Water Code (Section 10631.7) directs DWR to convene an Independent Technical Panel (Panel) to assist it in the development of new demand management measures, technologies, and approaches. The results of the panel's work may help refine the 20X2020 Team's recommendations to achieve the Governor's target.

AB 1420 Technical Advisory Committee

AB 1420 (Chapter 628, Statutes of 2007 AB 1420, Laird) requires the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by DWR, the State Water Resources Control Board, or the California Bay-Delta Authority, with certain exceptions, to be conditioned on the

implementation of the water demand management measures described in the urban water management plan, as determined by DWR. This law is expected to prompt significant additional implementation of conservation measures.

State Urban Water Use Efficiency Grant Program

DWR has provided over $85 million of grant funds since 2001 to urban water agencies and others for implementation of water conservation. Proposition 84 provides more funding for water conservation.

Urban Water Management Plans

Urban water suppliers are required by the Water Code (Urban Water Management Planning Act) to prepare Urban Water Management Plan and update these plans every five years. DWR then reviews the plan for completeness. Presently, complete plans with fully implemented BMPs are required for grant eligibility.

Integrated Regional Water Management

The Integrated Regional Water Management (IRWM) approach to water management, stressing regional planning and diverse portfolios of actions was reinforced in 2006 with the passage of Proposition 84, the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006. This act makes available $1 billion in grant funding for IRWM. The funding is allotted according to hydrologic region of the state. The resource management strategies described in the Water Plan Update are eligible for the grant funding. Every resource management strategy described in the *Water Plan Update 2005* makes a unique contribution to regional water management. Some are intended to improve water quality, for example, while others contribute to water supply. Urban water conservation, with its significant contribution to statewide water savings, is expected to be part of the portfolio of actions for funding..

AB 1881 Water Conservation in Landscape

AB 1881 (Laird) the Water Conservation in Landscape Act of 2006 charges DWR, among other things, with updating the Model Water Efficient Model Landscape Ordinance that was first required by state law in 1992.

The act requires DWR, by no later than January 1, 2009, to update the model ordinance. A local agency, including a charter city or charter county, is required to adopt the updated Model Ordinance or adopt its own local landscape ordinance that is at least as effective as DWR's by January 1, 2010.

The Water Conservation in Landscape Act of 2006 also requires the Energy Commission, in consultation with DWR, to adopt, by regulation, performance standards and labeling requirements for landscape irrigation equipment, including irrigation

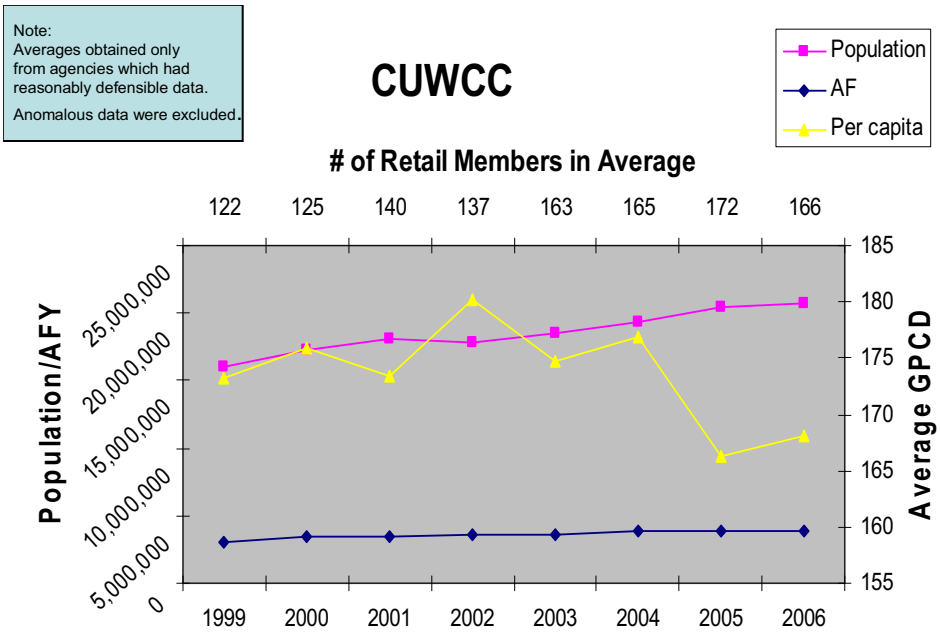
controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water.

California Urban Water Conservation Council (CUWCC) Urban Best Management Practices for Water Conservation

Much credit for urban water use efficiency improvements since 1991 can be given to the implementation of water use efficiency practices that have been institutionalized through the CUWCC MOU. This involves the active participation and united effort of urban water agencies, environmental interests, and the business community. They come together to plan, implement, and track a defined set of urban Best Management Practices (BMPs). As of October 2008 there were 394 signatories to the Urban MOU 211 of them are urban water suppliers representing 80 percent of all the urban water supplied in California.

CUWCC oversees voluntary implementation of urban BMPs. Water savings from implementation of the CUWCC Urban Best Management Practices (BMPs) implementation have grown steadily since the Urban MOU was first adopted in 1991. In its first year, the Urban MOU generated approximately 33,000 acre-feet of water savings statewide. By 2004, the last full year of data available from CUWCC, savings had grown to approximately 180,000 acre-feet, a year-over year growth rate of about 15% to 20%.

While growth in BMP water savings has been steady, the magnitude of these savings has not caused a substantial change in daily per capita urban water use. Statewide, CUWCC data suggest that BMP implementation, based on members that filed BMP reports with reasonably defensible data from 1999 through 2006, has reduced daily per capita urban water use for that group by about 8 gallons per person per day.



Federal Water Conservation Programs

U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation (USBR) Mid-Pacific Region Conservation Field Services Program (WCFSP) mission is to optimize the beneficial use of water. USBR also provides support for education and assistance programs in cooperation with agencies and stakeholders, with a particular emphasis on planning and implementing innovative water conservation measures.

The Mid–Pacific Region currently administers three grant programs (Water Conservation Field Services Program, CALFED Water Use Efficiency and Water 2025) focusing on improving water use efficiency in the urban and agricultural sectors. From 2003–2007, the Mid-Pacific Region provided approximately $14 million in grant funds on a cost-share basis to water districts. These include both urban and agricultural water use efficiency projects. The USBR also provides technical assistance and demonstrations of innovative technologies.

The Central Valley Project Improvement Act (CVPIA) (Public Law 102-575, 1992) provides for urban and agricultural water use efficiency in new and re-negotiated water contracts. Among the requirements are for the development of Water Management Plans. The USBR has developed criteria for the contents of the plan and includes the implementation of critical and exemptible best management practices (BMPs). The critical BMPs are mandatory and the exemptions must be demonstrated according to criteria set by the USBR. Among the critical BMPs are water measurements to each individual customer, a water pricing structure based at least in part on quantity of water delivered, and the provision of technical assistance to customers (farmers). This includes irrigation system evaluation and irrigation scheduling information.

USDA Natural Resource Conservation Service

USDA Natural Resources Conservation Service (USDA NRCS) provides funding and technical assistance for a number of environmental practices for agriculture, including investment in water saving practices on a voluntary basis.

The Environmental Quality Incentives Program (EQIP) provides funds for a variety of water conserving practices to individual producers. Practices include conversion to more efficient irrigation systems, installing irrigation pipeline or ditch lining, land leveling, and enhanced irrigation water management, among others. During the period 1997 – 2007, EQIP provided over $22 million for irrigation-related practices; including conveyance, micro irrigation, sprinkler irrigation and general irrigation water management.

In addition the Ground and Surface Water Program provided an additional $40 million for the period 2004 – 2007. These funds were only available in 23 of California's counties. Ground and Surface Water funds were used for improving irrigation systems, enhancing irrigation efficiencies, converting to less water intensive commodities, dryland farming, water banking and groundwater recharge.

Other grant opportunities at USDA NRCS include the Conservation Innovative Grant (CIG) which has provided funds for demonstration of limited irrigation no-till cropping systems that maximize economic returns and irrigation efficiency while sustaining and enhancing groundwater levels. NRCS also provides technical assistance including direct conservation planning, design, and implementation assistance that help growers plan and apply water conservation measures.

2. Estimate of Agricultural and Urban Applied Water Use

The water use data (attached table) was developed using information from DWR planning reports, the California Water Plan and Water Plan Updates. The information presented includes urban applied water, population, agricultural applied water, and irrigated crop acreage. The data is summarized statewide, and by six regions. Because changes had occurred in hydrologic region boundaries, the data was aggregated to six regional areas to ensure the six areas are identical for each year.

Urban Water Use

Urban applied water consists of water used by residential, commercial, industrial, large landscapes, energy development, conveyance losses, and intentional groundwater recharge. The urban water uses represent all the urban and rural areas, which includes urban areas (water provided by water agencies), and the rural areas (rural residential and self-supplied industries) which have their own groundwater wells and pump their own water.

For the Lahontan area, for 1950, the urban applied water was edited (increased) because in that particular bulletin, the self-supplied large water-using industries were not included in the total. The population data used in this report is from the U.S. census.

Urban water use is estimated and is not measured. DWR has historically used water agency delivery information to aid in estimating the urban water use in a region and statewide. Since 1960, DWR has gathered delivery information from urban agencies on a voluntary basis. This data, which includes monthly deliveries to single and multi-family residences, commercial, industrial, and large landscapes, is used by DWR to estimate urban water uses at each geographic planning unit (smaller than a county). These estimates are aggregated up to regional and statewide levels.

Agricultural Water Use

Agricultural applied water is the water applied by growers for meeting crop evapotranspiration requirements, and for other beneficial uses (such as frost protection and weed control). The acreage is the total of all crops planted which includes multiple cropping (such as double cropping – wheat followed by corn). The water used by agriculture growers is delivered by a water agency, diverted directly from a river or watercourse, or pumped from their own groundwater wells.

Agricultural water use estimates are not based on water delivery data. They are developed based on land use, weather, and estimates of on-farm efficiency. DWR performs about four land use surveys (at a county level) per year, to determine cropping acreage for those areas. For any year, the remaining counties that are not surveyed must be estimated, which is done using the latest survey for that county and the Agricultural Commissioners Crop Report (and any other information that might be available like crop acreage from a large water district). The acreage is used with evapotranspiration and rainfall data to estimate crop evapotranspiration. Estimates of additional beneficial uses (weed control, frost protection) are added where appropriate. Estimates of on-farm irrigation efficiency are used to estimate the applied water.

Changes and Unknowns in Estimation Methods

Before 1998, both urban and agricultural water uses were estimated based on a "normal" year. For urban, this meant that the water use estimates were based on data during years of average year climate (wet years would tend to reduce water use due to reduced landscape irrigation requirements). Also, the data used to estimate water use would not be from a drought year, where below normal deliveries would affect water use.

For agriculture, acreage was estimated based on recent history of cropping for years with normal water supplies and would adjust acreage to remove any effects due to abnormal market conditions. Average year climatic conditions would be used to estimate unit crop water use requirements.

Since 1998, DWR has estimated actual year urban and agricultural water use. For urban, urban agency water deliveries for that year would be used in the estimation process. For agriculture, acreage would be an estimate of the actual acreage for that

year. The crop water requirements are based on that year's evapotranspiration data and rainfall.

Pre-1998 estimates therefore are not estimates of actual year, but are meant to be representative estimates for an average or normal year.

There is uncertainty in comparing the pre-1998 data with the data beginning with1998. As mentioned, the later data is based on actual year conditions, the prior years based on a normal or average year. There are differences in how the water uses were calculated. DWR has improved upon the methods used to estimate both urban and agricultural water use over the years. Additionally, the earlier planning reports do not have the documentation to fully explain what uses were incorporated to compute the total uses.

To many, urban water use is thought of as the water used in residential, commercial, industrial, and large landscapes (parks, golf courses, etc). But, in developing water balances, urban water use includes conveyance losses, groundwater recharge, and energy development. These uses increase volumes and per capita water use. For some regions these volumes are small and will not affect total water use or per capita water use. For some regions, these uses are larger and will increase total water use and per capita water use.

Because of these changes in developing water use information over time, using normal and actual year estimations, and the uncertainty in the definition of "water use" (what uses are incorporated into total water use), it is difficult to confidently compare these different years of information from the different planning reports.

Statewide	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	1,989,000	3,257,000	4,380,000	5,043,000	5,762,000	6,573,000	7,765,000	8,775,000	7,796,300	8,869,500	8,610,700
Population	10,586,223	15,717,000	19,100,000	20,500,000	23,773,000	26,079,000	30,000,000	32,064,000	32,862,961	34,098,740	34,784,391
Urban Per Capita (Gallons/person-day)	168	185	205	220	216	225	231	244	212	232	221
Agricultural Applied Water (acre feet)	19,044,000	28,482,000	31,170,000	31,690,000	35,635,000	32,911,000	31,101,000	33,776,000	24,091,400	31,108,400	31,226,700
Irrigated Acreage (acres)	7,346,000	8,085,000	8,890,000	9,070,000	9,924,000	9,155,800	9,570,000	9,515,000	9,501,070	9,517,660	9,203,900
Unit Agricultural AW (acre-feet/acre)	2.6	3.5	3.5	3.5	3.6	3.6	3.2	3.5	2.5	3.3	3.4
North Coast & San Francisco Bay	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	446,000	610,000	910,000	1,083,000	1,120,000	1,248,000	1,354,000	1,424,000	1,130,600	1,219,300	1,259,500
Population	2,779,449	3,747,000	4,500,000	4,810,000	5,249,000	5,605,000	6,100,000	6,386,000	6,561,026	6,747,558	6,825,900
Urban Per Capita (Gallons/person-day)	143	145	181	201	190	199	198	199	154	161	165
Agricultural Applied Water (acre feet)	777,000	750,000	1,050,000	960,000	942,000	950,000	931,000	992,000	724,700	887,200	733,800
Irrigated Acreage (acres)	386,000	418,000	390,000	350,000	380,000	378,800	387,000	388,000	408,300	397,600	352,700
Unit Agricultural AW (acre-feet/acre)	2.0	1.8	2.7	2.7	2.5	2.5	2.4	2.6	1.8	2.2	2.1
Central Coast	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	58,000	110,000	170,000	181,000	231,000	269,000	273,000	286,000	261,500	295,700	293,900
Population	369,537	568,000	750,000	840,000	1,005,000	1,133,000	1,300,000	1,347,000	1,409,094	1,459,369	1,479,316
Urban Per Capita (Gallons/person-day)	140	173	202	192	205	212	187	190	166	181	177
Agricultural Applied Water (acre feet)	572,000	660,000	1,030,000	1,030,000	1,189,000	1,204,000	1,140,000	1,192,000	816,300	999,400	1,152,100
Irrigated Acreage (acres)	362,000	370,000	440,000	470,000	531,000	446,100	528,000	572,000	564,580	605,020	601,850
Unit Agricultural AW (acre-feet/acre)	1.6	1.8	2.3	2.2	2.2	2.7	2.2	2.1	1.4	1.7	1.9
South Coast	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	887,000	1,640,000	2,060,000	2,370,000	2,777,000	3,118,000	3,851,000	4,340,000	3,621,000	4,248,800	3,989,900
Population	5,353,710	8,551,000	10,510,000	11,240,000	12,969,000	14,148,000	16,300,000	17,299,000	17,554,701	18,236,361	18,610,864
Urban Per Capita (Gallons/person-day)	148	171	175	188	191	197	211	224	184	208	191
Agricultural Applied Water (acre feet)	1,020,000	1,080,000	1,110,000	920,000	988,000	895,000	727,000	784,000	691,900	908,400	758,400
Irrigated Acreage (acres)	652,000	476,000	550,000	430,000	392,000	308,500	319,000	313,000	291,880	285,570	272,670
Unit Agricultural AW (acre-feet/acre)	1.6	2.3	2.0	2.1	2.5	2.9	2.3	2.5	2.4	3.2	2.8
Central Valley	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	490,000	780,000	1,060,000	1,198,000	1,398,000	1,542,000	1,762,000	2,030,000	1,834,100	2,113,300	2,183,700
Population	1,814,597	2,468,000	2,860,000	3,100,000	3,866,000	4,383,000	5,100,000	5,702,000	5,970,280	6,230,864	6,403,960
Urban Per Capita (Gallons/person-day)	241	282	331	345	323	314	308	318	274	303	304
Agricultural Applied Water (acre feet)	12,702,000	21,080,000	23,620,000	24,830,000	28,121,000	25,406,000	23,759,000	25,828,000	17,671,300	23,820,200	24,248,300
Irrigated Acreage (acres)	5,123,000	5,981,000	6,580,000	6,880,000	7,702,000	7,175,500	7,365,000	7,271,000	7,279,400	7,307,300	7,070,600
Unit Agricultural AW (acre-feet/acre)	2.5	3.5	3.6	3.6	3.7	3.5	3.2	3.6	2.4	3.3	3.4
North & South Lahontan	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	29,000	56,000	90,000	112,000	118,000	147,000	224,000	277,000	249,100	308,900	276,800
Population	148,559	206,000	260,000	280,000	364,000	437,000	700,000	797,000	794,699	820,293	840,804
Urban Per Capita (Gallons/person-day)	174	243	309	357	289	300	286	310	280	336	294
Agricultural Applied Water (acre feet)	712,000	809,000	950,000	730,000	935,000	798,000	839,000	862,000	655,400	818,600	772,400
Irrigated Acreage (acres)	236,000	214,000	240,000	220,000	226,000	218,000	222,000	222,000	195,150	190,280	166,250
Unit Agricultural AW (acre-feet/acre)	3.0	3.8	4.0	3.3	4.1	3.7	3.8	3.9	3.4	4.3	4.6
Colorado River	1950 A	1960 B	1967 C	1972 D	1980 E	1985 F	1990 G	1995 H	1998 I	2000 I	2001 I
Urban Applied Water (acre feet)	79,000	61,000	90,000	99,000	118,000	249,000	301,000	418,000	700,000	683,500	606,900
Population	120,371	177,000	220,000	230,000	320,000	373,000	500,000	533,000	573,161	604,295	623,547
Urban Per Capita (Gallons/person-day)	586	308	365	384	329	596	537	700	1,090	1,010	869
Agricultural Applied Water (acre feet)	3,261,000	4,103,000	3,410,000	3,220,000	3,460,000	3,658,000	3,705,000	4,118,000	3,531,800	3,674,600	3,561,700
Irrigated Acreage (acres)	587,000	626,000	690,000	720,000	693,000	628,900	749,000	749,000	761,760	731,890	739,830